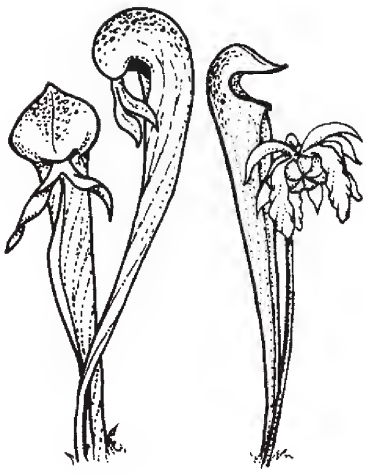
CARNIVOROUS PLANT NEWSLETTER

Journal of the International Carnivorous Plant Society

Volume 45, No. 4 December 2016



CARNIVOROUS PLANT NEWSLETTER

Journal of the International Carnivorous Plant Society
www.carnivorousplants.org

Volume 45, Number 4
December 2016

Front Cover: *Nepenthes nebularum*, Mindanao, Philippines. Photo by A. Bianchi. Article on page 132.

Back Cover: *Pinguicula* 'Red Starfish' summer rosette and flower (inset). This newly named cultivar was created by Dr. Miloslav Studnicka in 1994. Photo by Miroslav Srba. Article on page 158.

Carnivorous Plant Newsletter is dedicated to spreading knowledge and news related to carnivorous plants. Reader contributions are essential for this mission to be successful. Do not hesitate to contact the editors with information about your plants, conservation projects, field trips, or noteworthy events. Advertisers should contact the editors. Views expressed in this publication are those of the authors, not the editorial staff.

All correspondence regarding dues, address changes and missing issues should be sent to the Membership Coordinator at the ICPS. Do not send such correspondence to the editors. Checks for subscriptions should be made to the International Carnivorous Plant Society in US funds. Dues, including a subscription, are $30 per year.

International Carnivorous Plant Society, Inc.
2121 N. California Blvd., Suite 290
Walnut Creek, CA 94596-7351, USA
icps@carnivorousplants.org

Date of effective publication of the September 2016 issue of Carnivorous Plant Newsletter: 7 September 2016.

The ICPS is the International Cultivar Registration Authority (ICRA) for the names of cultivated carnivorous plants according to the International Code of Nomenclature for Cultivated Plants. Send relevant correspondence to the ICPS, Inc.

Carnivorous Plant Newsletter is published quarterly in March, June, September, and December by the ICPS, Inc., 2121 N. California Blvd., Suite 290, Walnut Creek, CA 94596, USA. Periodicals postage paid at Walnut Creek, CA and additional mailing offices. Postmaster: Send address changes to ICPS, Inc., 2121 N. California Blvd., Suite 290, Walnut Creek, CA 94596, USA. Printed by Allen Press, Inc., 810 E. 10th Street, Lawrence, KS 66044. Logo and masthead art: Paul Milauskas.
 ISSN #0190-9215

Contents

Nepenthes nebularum, a new species from Mindanao, Philippines

Geoff Mansell • 368 Hodges Road • Cordalba • QLD 4660 • Australia • info@exoticaplants.com.au
Wally Suarez • 0309 Purok 1C • Barangay Longos, Kalayaan • Laguna 4020 • Philippines

Abstract: The discovery of *Nepenthes nebularum* sp. nov. is here reported and thereby described as a new addition to the Philippine *Nepenthes* flora. This new species is closely related to both *N. truncata* and *N. robcantleyi*, differing mainly in the smaller stature of the plants, the more pronounced peristome teeth, and the bronzy, rather dense, and woolly indumentum found on the petiole wings, tendrils and traps. Further distinguishing traits are discussed in the description proper. With the description of this new species, the number of Nepenthes species in the archipelago now stands at over 53.

Key words: *Nepenthes*, south-eastern Mindanao, Philippines

Introduction

In September 2011 participants on a trip to a remote mountain on south-eastern Mindanao, with well-known geographer, traveller, and author Stewart McPherson, sighted epiphytically growing black *Nepenthes truncata*-like plants and photos were taken from a distance; it was stated by some of the participants on this same trip that this was evidence of the then newly described *N. robcantleyi* in habitat. However, due to the distance and foggy surroundings, no real distinguishing features could be observed in the photo except for superficial similarities to both *N. truncata* (Macfarlane 1911) and *N. robcantleyi* (Cheek 2011). On seeing the photo and noticing differences between these plants and *N. robcantleyi*, Exotica Plants organized several trips to the mountain in 2012 in hope of obtaining more details of the plants. These were undertaken by Philippine botanist and *Nepenthes*/orchid taxonomist, Wally Suarez. The mountain is very foggy, as mentioned above, and leeches as well as spiny rattans are abundant, which made the ascent difficult. After three attempts he successfully located a colony of these plants and a set of photographs were obtained which clearly distinguished these plants as different from both *N. robcantleyi* and *N. truncata* (Fig. 1).

The most notable distinguishing features of these plants are the pitchers and tendrils that are covered with a pubescence of soft bronzy hairs resembling wool, the smaller stature of the plants, their epiphytic preference, the lack of the lid dome ("boss") (Cheek 2011), and the lack of bracts on the partial peduncles of the male and female flowers. Unfortunately, no specimens were collected on this trip.

After more discussions with Stewart McPherson and Alastair Robinson, a further trip was incorporated as a leg of one of their Philippine excursions. In July 2013, a group climbed the same mountain. The route taken for this trip was different from the one used on the earlier trip by Wally Suarez organized by Exotica Plants and a different colony of these plants was located on the mountain top. Upon examining these photos and the discovery of this additional colony on the same mountain and noting the apparent introgression, more research was done.

From further photos and reports of sightings of the dark *N. truncata*-like plants on another mountain, also on south-eastern Mindanao, a fourth trip was organized. This second mountain was climbed and explored in April 2015 as a part of a Philippine excursion led by Stewart McPherson

Figure 1: *Nepenthes nebularum*. Two pitchers from different plants from Mt. Mayo, Mindanao. Photos by W. Suarez.

and Alastair Robinson. In the limited time available, a colony of dark *N. truncata*-like plants was located and no other *Nepenthes* species were seen. Photographs of the plants were taken in detail (Fig. 2 & Front Cover) and it could be seen that these plants did not represent *N. robcantleyi* or *N. truncata* and were nearly identical to the plants found by Wally Suarez on an earlier expedition. It should be duly noted that as previously observed, mature plants were also about one half the size of both *N. robcantleyi* and *N. truncata*. In the opinion of the authors, these new "black" *N. truncata*-like plants clearly represent a new species and are described here as *N. nebularum* sp. nov.

In July 2016, another trip, organized by Exotica Plants, was undertaken to this second mountain—its location also withheld to dissuade possible poaching—and other colonies of *N. nebularum* sp. nov. were observed in detail. Plants that fall within the range of *N. copelandii* were also observed on the ascent trail. Plants resembling, if not the same as, *N. cornuta* were also found by Wally Suarez on the 2012 trip, but on lower altitudes where *N. nebularum* grows.

Taxonomy

Nepenthes nebularum Mansell and Suarez sp. nov. (Fig. 3).

Type: From Mindanao, Philippines, sub-adult pitcher and leaf from specimen grown from seed at Exotica Plants. Collected on 1 July 2016. *Mansell* NEB14, *ex cult.* (Holotype: BRI AQ522212).

Description: A short stemmed rosette to 60 cm diameter and up to 1.0 m long in low light, usually much shorter. Stems terete and up to 1.5 cm in diameter. Leaves of mature plants to 16.5 cm long by 15 cm wide, broadly truncate, apices cordate-truncate, tips decurrent to tendril, with subobtuse and cordate bases tapering down to the petiole. Longitudinal nerves conspicuous 4-6 on each side of midrib, not equidistant, closer together the further away they are from the midrib. Outermost veins not full length. Pennate nerves numerous web like, inconspicuous. Petioles shallowly cana-

Figure 2: *Nepenthes nebularum,* Mindanao. Photo by A.Bianchi.

liculate, from 12-15 cm long × 0.6-0.8 cm in diameter near stem. Bases clasping the stem tightly, the wings rolling evenly and tightly, one over the other, over the adaxial canal immediately after leaving the stem, continuing smoothly and tapering slightly to the leaf blade, where they adjoin together. Tendrils 'D' shaped in cross-section. At first glance, the tendril appears terete but on closer examination, there are two raised ribs that run from the decurrent leaf tip and increase in size with the tendril thickness as they near the pitcher, where these continue and form the pitcher wings. Pitchers on mature plants are from 25-29 cm long × 7.5 cm at widest point, pubescent to villous with two distinct types/lengths of ferruginous to golden hairs. Pitcher cylindrical in most part, wider in the upper half slightly constricted in the middle, becoming elliptical in the lower part as it tapers to the tendril attachment, with two prominent fringed wings running +/-parallel up the front of the pitcher and terminating just below the peristome edge. Wings ca. 1.5-1.7 cm with fringe elements from 1.2-1.5 cm long. Mouth horizontal at the front angling gradually up at about 30° and then steeply forming a narrow neck on the pitcher. Hip on pitcher rear at the back of the mouth. Peristome 6-7 cm wide approximately midway around mouth. Flatly rounded down following the rim of the mouth at the front with a pronounced raised triangular fold at the front of the mouth. Rest of peristome flattened and flared, gently curving on the outer edge between several undulations forming sharp folds. Coarse ribs – sharp inverted 'V' in section, ca. 2 mm high at 3 mm spacing on the outside edge of the peristome, closer together as they enter the mouth, terminating in sharp tooth like projections extending into the mouth several millimeters. Lid ca.7.5 × 5.5 cm, held approximately horizontal, deltoid-ovate. Front rounded, base cordate. Margins slightly undulate. Top surface covered in short, golden/ferruginous hairs. Noticeably, 2 prominent rows start together from the lid attachment point, curving outwards each side of the indent created from the keel below, and curve back in, nearly

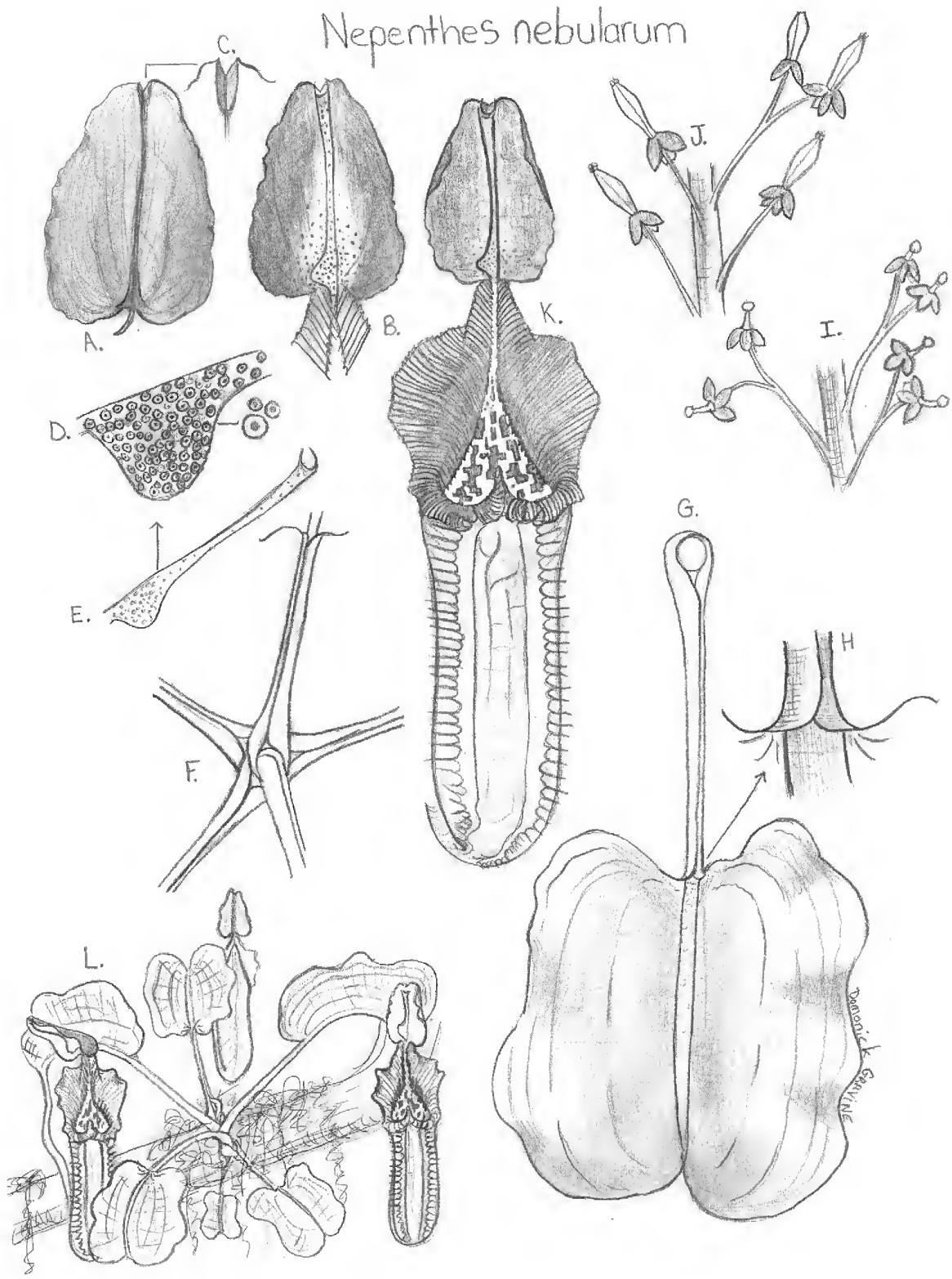


Figure 3: *Nepenthes nebularum*. (A) lid upper surface, (B) lid lower surface, (C) lid pleated tip detail, (D) basal appendage gland detail, (E) Keel, basal and apical appendages detail, (F) top view of petiole to stem attachment, (G) top view of an entire leaf, petiole and stem attachment, (H) detail of petiole finish at leaf blade, (I) section of male inflorescence, (J) section of lower part of female inflorescence showing single flowered to two flowered change, (K) pitcher, (L) mature epiphytic plant. Drawn from herbarium specimens and habitat photos by Domonick Gravine.

meeting, at the front of the lid. There is a slight domed portion near the rear of the lid over the basal appendage below. The lid lower surface has a raised keel running longitudinally. It has a raised vertically flattened, rounded appendage at the rear which is in the domed portion. From about half way along the lid length the keel widens and flattens and the front part forks into a raised, partially hollowed, semi-cone like appendage and tapers down to a stop several millimeters from the front of the lid. The lid is folded down between this apical appendage and creates a pleated recess which can also be seen on the top of the lid as an elongated V-shaped depression. Small, rimmed nectar glands present and numerous on basal appendage and around its base in the recessed area. Slightly larger similar glands sparse around appendage base and continuing sparsely along the keel to the apex of the lid. Lid also covered, +/- evenly spaced, and with minute recessed glands. These do not seem to be nectar glands. Keel, basal appendage recess, and apical appendage all cream/yellow colored, the rest of the lid underside purple/maroon. Spur simple sometimes bifurcating at tip, 2-3 cm long. Female inflorescence up to 120 cm long, 1-flowered in the lower part and then the rest is 2-flowered, no bracts. Peduncles ca. 50 per inflorescence. Male inflorescence ca. 80 cm long, two-flowered, no bracts. Indumentum: Ferruginous dendritic hairs dense on pitcher and tendril ca. 0.25-0.5 mm. Tendril, pitcher lower part, pitcher bud, midrib under leaf and petiole wings densely covered also in tufted (caespitose) ferruginous hairs, sparse on rest of pitcher, ca. 2-3 mm long. Although these hairs are tufted the longest one(s) extend to this length others in tuft are shorter. Short ferruginous/ golden hairs are present in a row ca. 3-4 mm running along the inside edge of the lid lower surface, possibly dendritic in shape, 0.1 mm. Leaf upper surface has simple white hairs ca. 3 mm on entire surface. Sparse underneath blade. Leaf margin is edged with ferruginous hairs ca. 1-2 mm.

1. Ecology: Mainly epiphytic on tall trees in sub-montane forests at altitudes to 1,800 m asl on two mountains in south-eastern Mindanao, but suspected to occur further north, where the seed parent of *N. robcantleyi* was located (see Discussion below). Sometimes lithophytic on cliff faces. They grow sympatrically, on at least one site, with lowland *N. truncata* and *N.* cfr. *cornuta*, but both occur at much lower elevations than those preferred by the new species. However, a few plants of highland *N. truncata* were noted growing in the same altitude as *N. nebularum*, which allows the possibility that the two species may hybridize on some occasions (again, please refer to the Discussion below).
2. Etymology: The name originates from the Latin word *nebula*, meaning clouds. Inflected in the case genitive, *nebularum* means "cloud loving" and "coming from the clouds". This is in reference to the habitat in which the plants are growing that is frequently covered in fog.
3. Discussion: *Nepenthes nebularum* sp. nov. is a member of Benedictus Danser's putative *Regiae* group, and is most closely related to *N. truncata*, the differences of which are summarized in Table 1. The authors are of the position that *N. alata* and its associated species represent a group of its own, and does not include *N. truncata* and related taxa. While the readers may be inclined to think that this new species is the same as *N. robcantleyi*, we believe otherwise. While we prefer not to discuss it in length here, it is worth noting that all plants observed in the wild never approached the sizes obtained by *N. robcantleyi*. As a matter of fact, we are of the conviction that *N. robcantleyi* represents a lineage rooted from a hybridogenic event involving *N. truncata* and *N. nebularum*. On this conviction it should be duly noted that the progeny of the *N. robcantleyi* cultivars was not taken into consideration as they are a further hybridization and certainly do not all fit the description of *N. robcantleyi*. It is also for this reason that we are not in favour of plans to reintroduce *N. robcantleyi* in the wild, and for such purposes, *N. nebularum* is the logical and more preferable candidate. A separate paper on this matter is in preparation.

Table 1. Differences between *N. nebularum*, *N. robcantleyi*, and *N. truncata*.

Specific characters	*N. nebularum*[1]	*N. robcantleyi*[2]	*N. truncata*[3]
Plant size and growth habit	30 cm long × 60 cm dia. Stem 1.5 cm dia. Epiphytic.	1.0 m long × ca. 1.0 m dia. Stem 2 cm dia. Terrestrial.	3.0 m long × ca. 1.4 m dia. Stem 3 cm dia. Terrestrial, sometimes epiphytic.
Leaf outline	Broadly truncate, widest at apex. Apex truncate with leaf blade extending down tendril, acuminate. Leaf blade ca. 16.5 × 15 cm.	Oblong-elliptic. Apex truncate with acumen, base cordate. Leaf blade 25.0-28.55 × 23.0-26.5 cm.	Sub-rectangular, widest at apex. Apex emarginate. Leaf blade 45 × 22 cm.
Leaf venation	4-6 each side of midrib, not equidistant. Outermost veins not full length of blade. Pennate nerves numerous, web like, inconspicuous.	2-4 on each side of midrib. Pennate nerves inconspicuous.	5 each side of midrib, +/- equidistant. Pennate nerves numerous, conspicuous.
Petiole	Appearing terete as wings are folded tightly over adaxial canal. Actually shallow canaliculate, winged. ca. 12-15 cm long × 0.6-0.8 cm near stem. Clasping stem tightly. Wings folding tightly and evenly, one over the other over the adaxial canal, immediately after leaving stem. Continuing smoothly to the leaf blade, finishing together.	Pseudo-terete, canaliculate, winged. 22-23 cm long × 2.0 cm near stem. Clasping stem loosely. Wings start off spread, as in *N. truncata* and then roll tightly, as in *N. nebularum*, up to the leaf blade usually finishing unevenly from each other.	Pseudo-terete, shallowly canaliculate, winged. 27 cm long × 1.8 cm at base. Clasping stem loosely. Wings start off spread then roll tighter as in *N. nebularum*, up to the leaf blade usually finishing unevenly from each other.
Tendril	D-shaped in section due to two raised ribs running from the leaf tip decurrency along the tendril increasing in size forming the pitcher wings. Villous/shaggy with 2 sorts of hair. New pitcher bud the same.	Cylindrical in section. Glabrous. New pitcher bud has dense red-brown dendritic hairs.	Cylindrical in section with a slightly flattened edge. New pitcher buds pubescent with short ferruginous hairs.
Pitchers	ca. 27 × 7.5 cm at widest point at mouth. Villous with two types and lengths of ferruginous to golden hairs. Mostly cylindrical, wider in the upper half, slightly constricted at middle, elliptical in lower half tapering to tendril. Hip on rear +/- level with mouth.	ca. 33 × 9.5 cm widest at the base. Appear glabrous but are minutely puberulent. Broadly cylindrical narrowest below peristome.	Up to 48 × 11.7 cm. Wholly cylindrical or slightly ovate in the bottom third, narrowing slightly in the middle and widening towards the mouth.
Pitcher wings	Prominent, +/- parallel, 1.5-1.7 cm wide, fringe hairs 1.2-1.5 cm, terminating just below the peristome.	Not parallel. ca. 1.0 cm wide, fringe elements 1.0-1.2 cm long. Terminating underneath the peristome.	Rudimentary wings run the length of the pitcher, not parallel, wider at the pitcher base, narrowing towards the mouth.
Peristome	6-7 cm wide approx. midway around mouth. Flatly rounded down following the rim of the mouth at front with a pronounced triangular upward fold at front of mouth. Rest of peristome flattened and flared, gently curving on the outer edge between several (4-5) undulations forming sharp folds. Coarse ribs - sharp inverted 'V' in section, ca. 2 mm high at 3 mm spacing on the outside edge of the peristome, closer together as they enter the mouth, terminating in sharp tooth like projections extending downwards into the mouth several mm.	6-9 cm wide below the column. Gently curved in section, horizontal in front, center rising by 1(-3) cm, outer edge of peristome slightly undulate. The ribs ca 1.5 mm apart, 1.0-1.5 mm deep, inner edge with teeth 3-4 mm long, those along the central seam ca 2 mm long.	Peristome up to 6 cm wide and sometimes the front protruding in a triangle upwards, broad and flared but can sometimes roll back, depending on populations. Coarse ribs 1-2 mm apart, 1-2 mm high, outer edge sinuate, inner surface dentate but not generally in defined teeth.

Table 1. Continued.

Specific characters	*N. nebularum*[1]	*N. robcantleyi*[2]	*N. truncata*[3]
Lid	ca. 7.5 × 5.5 cm, deltoid-ovate, front rounded base cordate, margin slightly undulate. Top surface covered in short ferruginous/gold hairs. 2 prominent rows run from lid attachment together separating each side of keel below, curving back in at front. There is a slight dome over the basal appendage below. Lower surface has a raised keel running longitudinally with a raised, vertically flattened, rounded appendage at the rear which is in the domed portion. About half way along the lid length the keel widens and flattens and the front part forks into a raised, partially hollowed, semi-cone like appendage and tapers down to a stop several millimeters from the front of the lid. Lid pleated down above this appendage. Short ferruginous/ golden hairs present in a row ca. 3-4 mm running along the inside edge of the lid lower surface. Small, rimmed nectar glands present and numerous on basal appendage and around its base in recessed area. Slightly larger similar glands sparse around appendage base and continuing sparsely along the keel to the apex of the lid. Lid also covered, +/- evenly spaced, with minute recessed glands. These do not seem to be nectar glands. Keel, basal appendage recess, and apical appendage all cream/ yellow colored, the rest of the lid underside purple/maroon. Spur simple sometimes bifurcating at tip, ca. 2-3 cm long.	ca. 9.5 × 9.5 cm, broadly ovate to suborbicular apex rounded, base shallowly, then abruptly cordate, upper surface with ovate boss ca. 4 × 3 cm, raised 1 cm, immediately above the basal appendage on the lower surface; lower surface with a laterally flattened more or less semicircular basal appendage ca. 4 mm high, 13 mm long, arising from a keel 3-5 mm high, ca. 2.5 cm long, continuing towards the apex as a raised midrib terminating in a small cylindrical terminal appendage ca. 3 mm wide, projecting from the surface ca. 2 mm, placed 7 mm from the apex; lid nectar glands restricted to the ovate boss (concave) area ca. 4 × 3 cm around the basal appendage; glands dense, orbicular, dome-volcano-like 0.15 mm in diameter. Within a 5 mm radius of the base of the appendage, otherwise transversely elliptic 0.3-0.5 mm wide; remainder of lid with minute thinly scattered red depressed globose glands ca. 0.05 mm diameter; spur entire, stout, ca. 12 × 1.5 mm, apex truncate-concave.	14.5 × 12.5 cm. at widest point. Lid cordate to ovate with a cordate base. Top surface has two distinct raised ribs starting together from the attachment point and running each side of the indentation caused by a keel on the lower surface and nearly joining again at the front of the lid. There is a raised dome in the rear centre of lid which varies in height in different populations, above a basal appendage. Lower surface has a raised rounded basal appendage inserted in the dome part of the lid and as part of a keel or remnants of one, which runs the length of the lid. In specimens where the rib is more pronounced it splits at the apex and terminates in two small protrusions. Large crater like nectar glands numerous, prominent, concentrated under lid dome and on basal appendage, sparsely scattered around the rest of the surface under the lid combined with other minute glands. Spur simple av. 2.5 cm long.
Inflorescence	Female: up to 120 cm long, 1 flowered in the lower part and then the rest is 2 flowered, no bracts. Peduncles ca. 50 per inflorescence. Male: ca. 80 cm long. Two-flowered, no bracts.	Female: 140 cm long, peduncle 97 cm long; partial-peduncles ca. 35 per inflorescence, two-flowered, bracts filiform-linear. Male: 2.13 m long; peduncle 97 cm long; partial-peduncles 100-130, two-flowered, lacking bracts.	Female: to 1.8 m long, peduncle 80 cm, partial peduncles ca 150 per inflorescence, two flowered, small or no bracts on partial peduncles. Male: to 1.2 m long, peduncle 80 cm, partial peduncles ca 200, two flowered. No bracts
Indumentum	Ferruginous dendritic hairs dense on pitcher and tendril ca. 0.25-0.5 mm. Tendril, pitcher lower part, pitcher bud, midrib under leaf and petiole wings densely covered also in tufted ferruginous hairs, sparse on rest of pitcher, ca. 2-3 mm long. Although these hairs are tufted the longest one(s) extend to this length others in tuft are shorter. Leaf upper surface has simple white hairs ca. 3 mm on entire surface. Sparse underneath blade. Leaf margin is edged with ferruginous hairs ca. 1-2 mm.	Red-brown dendritic hairs ca 0.5 mm long, dense on leaf-buds, sparse on lower surface of blade, upper part of pitcher.	Leaf margin fringed in dendritic red hairs ca. 0.8 mm long. Pitcher ferruginously villose. (Macf). Actually ferruginously pubescent with dendritic hairs ca. 0.1 mm, denser near tendril attachment, tendril and leaf buds.

[1] Most measurements of *N. nebularum* sp. nov. were taken in habitat by Andrea Bianchi and Ryan B. Rizalda.
[2] The plant of *N. robcantleyi* owned by Shinya Yamada of Japan is from the original collection and is a sibling of *N. robcantleyi* 'Queen of Hearts', (according to Cheek 2011). It is male and has very well developed partial peduncle bracts ca. 1 cm long.
[3] The *N. truncata* data are based on the description (Macfarlane 1911, as revised by Cheek and Jebb 2001) and observations over 30 + years of growing wild collected material and many thousands of cultivated plants of *N. truncata*.

4. Conservation Notes: *Nepenthes nebularum* is presently known from two disjunct mountains in south-eastern Mindanao, but there are indications that it is much more widespread on the island, their detection limited due to the paucity of research undertaken because of uncertainties on securities, and their preference for growing on tall trees in high-altitude, remote areas. On the two aforementioned mountains, human disturbance is limited on the lowermost slopes, and traces of neither clearing nor logging were observed on the upper elevations. Even mountaineering activities are extra-limital. However, such may not be the case on other areas where *N. nebularum* is suspected to be found. Indeed, if our supposition is correct that *N. robcantleyi* is a natural hybrid involving *N. truncata* and *N. nebularum*, then the population of the latter should be already extinct on the site where the seed parent of *N. robcantleyi* was found (Rob Cantley, email correspondence with Wally Suarez). Awaiting a thorough population determination of the new species on the entire island, we propose that *N. nebularum* be classified as 'Data Deficient' under IUCN.

Acknowledgements: Andrea Bianchi, Mark Rouse, Andy Smith, Alastair Robinson, Stewart McPherson, and Ryan B. Rizalda provided insights and details pertaining to *N. nebularum* and its habitat. Domonick Gravine executed the line drawings. Photographs used with permission and supplied by Exotica Plants, Wally Suarez, Andrea Bianchi.

References

Cheek, M.R., and Jebb, M. 2001 Flora Malesiana. Series I. Seed plants. Volume 15. Nepenthaceae. Leiden: Nationaal Herbarium Nederland. 164p.

Cheek, M. 2011. *Nepenthes robcantleyi* sp. nov. (*Nepenthaceae*) from Mindanao, Philippines. Nordic Journal of Botany 29: 677-681

Cheek, M., and Jebb, M. 2014. Expansion of the *Nepenthes alata* group (*Nepenthaceae*), Philippines, and descriptions of three new species. Blumea 59(2): 144-154

Macfarlane, J.M. 1911. New species of *Nepenthes*. Contributions from the Botanical Laboratory of the University of Pennsylvania 3(3): 207-210

IUCN. The IUCN Red List of Threatened Species. Version 2013.2. Available online: http://www.iucnredlist.org

The Search for all of the victims and all of the killers

Douglas W. Darnowski • Department of Biology • Indiana University Southeast • 4201 Grant Line Road • New Albany • Indiana 47150 • USA • ddarnows@ius.edu

Keywords: seaweed, algae, brackish, marine, prey.

Carnivorous plants often claim the name "insectivorous" for the simple reason that most carnivorous traps usually contain insects, and, even when not insects, trapped prey are usually close cousins of the insects from within the Phylum Arthropoda. An example of this is when bladderworts (*Utricularia* spp.; Lentibulariaceae) trap crustaceans such as amphipods and copepods, which are arthropods, like insects. Indeed, Darwin's book on the carnivorous plants recognizes this fact with its title Insectivorous Plants (Darwin 1875). Splitting open a pitcher from *Sarracenia leucophylla*, as an example, usually reveals one chitinous arthropod exoskeleton after another.

There are, of course, examples of carnivorous plants preying on other groups in the Kingdom Animalia, such as the trapping of vertebrates (Phylum Vertebrata) by genera such as *Sarracenia* (e.g. Butler *et al.* 2005), and rotifers of Phylum Rotifera can be found in the aquatic traps of *Utricularia* (e.g. Kurbatova & Yershov 2009).

The ubiquity of arthropods as prey and the noticing of vertebrates can be explained by two facts. First, the arthropods are the largest, and, by several measures, the most successful phylum on Earth. They may not build steel bridges or conduct controlled studies, but they shine for the sheer number of species and individuals found on Earth. So, no wonder that the land plants have fed so much on such abundant prey.

Second, the vertebrates are often noticed because they are in our own phylum and we tend to notice our own kind first. Also, given the size, strength, and complex nervous systems of vertebrates, trapping these animals or obtaining nutrients from them in some other way seems especially impressive and, thus, noteworthy. Thus, as an example, we notice newts in *Sarracenia purpurea* traps (Butler *et al.* 2005).

All of this raises the question: what about the many other phyla of animals? Are they the subject of trapping by carnivorous plants? From that flows the further question: could a look at these phyla, not known to be trapped by carnivorous plants, point out targets to search for new carnivorous plants?

There are well over 30 phyla of animals (Sadava *et al.* 2012; Mason *et al.* 2017; Table 1), the majority of which are at least partly marine and not known as prey for plants. One might also add the untrapped classes and orders within phyla that have been recognized as prey for carnivorous plants. For example, consider the cephalopod mollusks: the squids, the octopuses, and their relatives, which have not been recorded as plants' prey, though their cousins in the same phylum have.

Given that life started in the seas, it is no surprise that the greatest number of animal phyla can be found in those seas. This makes for abundant prey. It is also important to recall that many animal phyla, such as the mollusks, may have members which are sessile, and hard or impossible to trap as adults, but which have motile larvae which could serve as prey for carnivorous plants.

Some of this lack of trapping could have to do with the relative lack of land plants having returned to marine or brackish habitats (Table 1). Those plants that have returned to salty water

Table 1. Some phyla of animals (based on Sadava *et al.* 2012; Mason *et al.* 2017).

Phylum	Marine/Estuarine Members
Sponges (multiple phyla)	Many
Ctenophora	All
Placozoa	All
Cnidaria	Many
Orthonectids	All
Rhombozoans	All
Chaetognatha	All
Bryozoa	Many
Entoprocta	Most
Platyhelminthes	Many
Gastrotricha	Some
Rotifera	Many
Nemertea	Most
Brachiopoda	All
Phoronida	All
Annelida	Many
Mollusca	Many
Kinoryncha	All
Loricifera	All
Priapulida	All
Nematoda	Some
Nematomorpha	None
Tardigrada	Some
Onychophora	None
Arthropoda	Many
Xenoacoelomorpha	Some
Echinodermata	All
Hemichordata	All
Tunicata	All
Lancelata	All
Vertebrata	Many

are all angiosperms—there are no salt-water examples of gymnosperms, fern allies, or non-vascular land plant groups (Cook 1996; Table 2). The few truly marine angiosperms, such as seagrasses, have simple bodies and no obvious traps, and there are not that many angiosperms in brackish habitats, either. Salt-water habitats have probably been overlooked for this reason as well as the reason that the insects and mammals that receive so much attention as prey for known carnivorous plants are comparatively rare in these salt-water habitats.

But what about seaweeds? (From the outset, it should be made clear that this paper is a speculative one, designed to argue that certain organisms may be carnivorous. The paper aims to point the direction for new research and to argue from first principles why these organisms probably exist. It does not provide hard data and is, thus, more theoretical.)

Why might seaweeds include carnivorous plants? (These could be referred to as salt-water carnivores.) First, it should be noted that the Green and Red Algae, including familiar edible oceanic plants like sea lettuce (*Ulva lactuca*) and dulse (*Palmaria palmata*) are part of the Plant Kingdom, based on molecular and other studies of the last few decades (Sadava *et al.* 2012; Mason *et al.* 2017). It could also be argued that only the Green Algae can be considered "plants," given their close connection to the land plants which include the recognized carnivorous plants. Any search among the Green Algae for carnivores could usefully and easily include a check of the Red Algae for carnivory. Given their general nature as photoautotrophs, this would probably be an interesting related work for carnivorous plant workers.

The Brown Algae include seaweeds such as kelp and evolved separately from the Plant Kingdom. They are more closely related to organisms such as the single-celled

Table 2. Aquatic flowering plants in marine, estuarine, brackish waters (from Cook 1996 except *Taylor 1989, and personal observations in Great Marsh near Chestertown, Maryland, USA).

Family	Genera
Apiaceae	*Lilaeopsis, Oenanthe*
Araceae	*Cryptocorne*
Cymodoceaceae	*Amphilbolis, Cymodocea, Halodule, Syringodium, Thalassodendron*
Droseraceae	*Aldrovanda*
Eriocaulaceae	*Eriocaulon*
Hydrocharitaceae	*Euhalus, Halophila, Thalassia*
Juncaginaceae	*Triglochin*
*Lentibulariaceae	**Utricularia*
Najadaceae	*Najas*
Poaceae	*Coleanthus, Paspalum*
Potamogetonaceae	*Ruppia*
Primulaceae	*Samolus*
Zannichelliaceae	*Althenia, Lepilaenia, Zannichellia*
Zosteraceae	*Heterozostera, Phyllospadix, Zostera*

diatoms and the decomposers known as watermolds (Mason *et al.* 2017). These are not plants, though they are photoautotrophs like plants and have evolved many similar forms to those of the Green and Red Algae. For this reason, any search for marine carnivorous plants among the Green Algae might at the same time also look among the photoautotrophic Brown Algae for carnivory as an interesting connected study.

Based on the fossil record, seaweeds, including the Green Algae, which can be called "plants," have existed for at least three times as long as the flowering plants, giving them plenty of time to evolve the carnivorous syndrome.

What factors might be important in searching for salt-water carnivorous plants and for carnivorous activity among other seaweeds? First, consider that turbulence is important for terrestrial carnivores which either live in areas with low turbulence in the air or place their traps where delicate prey will not be blown away by turbulence, as with sundews. Their leaves are often low to the ground in a zone with poorly stirred or unstirred air or found among other vegetation that lowers or eliminates turbulence. Also, bladderworts usually have their traps in waters with little or no turbulence or movement, and the rare exceptions, especially the rheophytic bladderworts, stop making traps in very turbulent water (Adamec *et al.* 2015).

Turbulence is likely to be an issue for salt-water photoautotrophs, including plants, especially due to the near-constant action of marine tides. Personal observations made it clear that this is even true in the relatively protected habitat found in estuaries. Thus, salt-water carnivores would need to reduce turbulence in some way. This could come in the form of traps with pits or tunnels, similar to terrestrial carnivores like *Sarracenia* or *Genlisea*, which prey could enter, allowing an internal trapping mechanism to work in an internal low-turbulence environment.

Another possibility would be for seaweeds to be part-time carnivores if they were stranded above the water and, thus, out of the turbulence generated by tides. These could be sticky on their surfaces, trapping and quickly digesting prey between tides. Seaweeds, plants and non-plants alike, generate abundant mucilage which could be used in this way as it is used by *Drosera* and *Pinguicula*.

A third possibility would be for salt-water carnivores to be found in places where the density of growth lowered turbulence. One possible habitat like this could be the Sargasso Sea off Bermuda, where the dense growth of seaweeds, especially *Sargassum*, provides a nursery for young animals, potential prey, and lowered turbulence due to the density of seaweed growth.

In any case, the search for salt-water carnivores among plants and other photoautotrophs should also look at habitats which are similar to those of terrestrial and fresh water carnivorous plants: ones with high light intensity and low nutrient availability. The high light in these habitats provides enough energy for carnivorous plants to make their complicated traps while performing the normal daily activities seen in all plants. This would require low-turbidity salt-water habitats for carnivory in seaweeds, including those accepted as plants.

Low nutrient levels provide the selective pressures for carnivores to have evolved their carnivorous structures. There are many low-nutrient salt-water habitats, such as the previously mentioned Sargasso Sea. These would be analogous with the bogs and tepuis where so many terrestrial carnivorous plants are found.

So, it seems probable that salt-water carnivores exist: it's time to go looking for the killers.

Acknowledgements: Thanks are due to Prof. David Taylor (Indiana University Southeast) for helpful suggestions and the loan of materials and to the Dean of Research of Indiana University Southeast for two grants to support this work.

References

Adamec, L.A., Fleischmann, A., and Pasek, K. 2015. Biology of the trapless rheophytic *Utricularia neottioides*: Is it possible to grow this specialized species in cultivation? Carnivorous Plant Newsletter 44(3): 104-114.

Butler, J.L., Atwater, D.Z., and Elison, A.M. 2005. Red-spotted newts: an unusual nutrient source for northern pitcher plants. Northeastern Naturalist 12: 1-10.

Cook, C.D.K. 1996. Aquatic Plant Book. SPB Academic Publishing, Amsterdam, NY, USA.

Darwin, C. 1875. Insectivorous Plants. John Murray, London, United Kingdom.

Kurbatova, S.A., and Yershov, I.Y. 2009. Crustaceans and rotifers in the predatory feeding of *Utricularia*. Inland Water Biology 2(3): 271-275

Mason, K.A., Losos, J.B., and Singer, S.R. 2017. Biology, 11th edition, McGraw Hill Education, New York, NY, USA.

Sadava, D.E., Hillis, D.M., Heller, H.C., and Berenbaum, M. 2012. Life: The Science of Biology, 10th edition, W.H. Freeman, New York, NY, USA.

Taylor, P. 1989. The Genus *Utricularia*: A Taxonomic Monograph. Kew Bulletin Additional Series XIV. Royal Botanical Gardens, Kew, United Kingdom.

Surviving wild Papua

Arthur Yin • San Jose • California • USA • arthuryin@gmail.com

Keywords: travelogue: *Nepenthes*, *Utricularia*, New Guinea, Papua, West Papua, Indonesia.

Introduction

The island of New Guinea in Southeast Asia is the second largest island in the world. The western or Indonesia half of New Guinea is Papua. The eastern half is the country of Papua New Guinea. West New Guinea is officially named Papua, although the local preferred name is West Papua. To further the confusion, western New Guinea contains the provinces of West Papua and Papua. For this trip report, Papua is used for the entire Indonesian region and the provinces will be labeled accordingly.

New Guinea has a total of eleven currently recognized *Nepenthes* species (Jebb & Cheek 1997; Cheek & Jebb 2001). During the two and a half week trip, the group led by Chien Lee encountered nine *Nepenthes* taxa and three *Utricularia* taxa. We also encountered a number of orchids, gingers, and a few Rhododendron species. In addition, we observed whale sharks and numerous avian species including several birds-of-paradise.

Prior to this trip, I have travelled to Borneo and Sumatra with Chien. Many members of the trip also travelled with Chien several times as well. This report provides a summary of the two and a half week trip in 2014. Although this paper focuses on the adventurous portions of the trip for entertainment value, there were many other positive aspects of the trip that are briefly mentioned.

Biak Islands

The trip began on July 27th, 2014, on the Biak Islands off the northern coast of Papua Province. Near a sandy beach with limestone cliffs, the group saw the Biak form of *Nepenthes insignis* (Fig. 1). Unfortunately only a few plants remained at the location. Most of the plants looked in poor health due to lack of water. We talked to the locals and asked them to watch over the plants in the future. I also had ventured out to several coastal limestone isles on my own looking for more plants, but did not come across any.

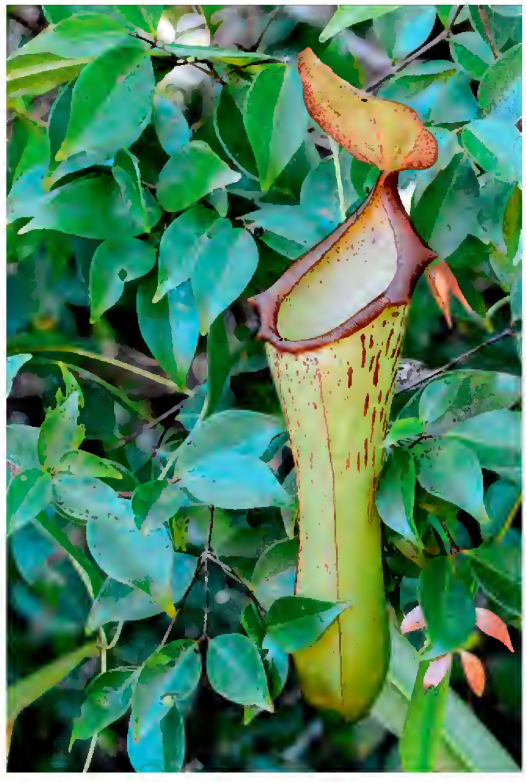


Figure 1: *Nepenthes insignis*.

In the afternoon, we stopped at a bird park. Chien noticed a bird specimen had escaped its exhibit and was on the tree top. One of the highlights of the park was the free roaming cassowary (*Casuarius casuarius* × *unappendiculatus*).

Western Sudirman Range

Next day we flew on a small propeller plane to the main island of New Guinea and started to as-

cend the western Sudirman Range of Papua Province on 4x4 vehicles. One vehicle required fuel and the trucks split up. My vehicle became the first to leave the city and we drove past the giant staghorn ferns (*Platycerium wandae*) due to miscommunication. When all our vehicles reconvened, we stopped to see the mainland form of *N. insignis* growing from the ground to the treetop. On the ground nearby, a single *Nepenthes mirabilis* plant also grew. Further in the forest, a colony of *Nepenthes ampullaria* covered the detritus laden floor.

We continued the drive and came across moth orchid (*Phalaenopsis amabilis*) and *Dendrobium spectabile*. We arrived at our lodging close to midnight, after off-roading for about ten hours. During the ride, our driver would floor the gas pedal as we approached a hillside and the tires slipped as the truck climbed. We later noticed that the front tires were bald and that the tires were never rotated! The rear tires had complete treads. Overall, the drive was rough and made worse as the extra diesel fuel tanks were stored inside most vehicles with the fumes permeating. Unfortunately our backpacks were stacked against the tanks and diesel rubbed against our gear.

When the third morning came, we set off to obtain permission to explore the area from the local police station, which is a requirement of foreign visitors in many parts of Papua. On the way, Chien spotted an arboreal Hikida's forest dragon (*Hypsilurus hikidanus*) with olive green patches and occasional blue dorsal spines. After the short intermission, we arrived at our destination. We were asked to wait while the law enforcement reviewed our paper work. Due to their strict protocol, our color passport copies were not accepted, and they insisted on making their own copies. Their copier was out of service. Furthermore, digital photos of the passports were declined. Chien traveled to three photocopy shops in order to fulfill the task. Unfortunately five minutes prior to his return, our drivers left for coffee. Chien tried to catch them by foot unsuccessfully. By the time the drivers returned, morning was over.

Upon arriving at our destination, we asked a villager permission to venture on his property. He was unresponsive to the idea, thinking that we were crazy to travel around the world to photograph plants. This reaction came as a complete surprise as Chien had visited the landowner the previous year in a scouting trip and discussed bringing tourists, which the landowner seemed fine with.

After speaking to him for quite some time, he thawed and allowed us to proceed, but was very wary and thought we were after some natural resource of value. A group of villagers accompanied us out to the site. Immediately we came across a pink and white flower of a ginger-lily (*Alpinia* sp.). Soon we came across the target species, *Nepenthes klossii*. *Nepenthes klossii* was impressive in situ. From photographs, the pitchers looked similar to *Nepenthes aristolochioides* with the unusual domed shape – although one can argue *N. aristolochioides* pitchers are more bulbous and refined looking. However after seeing both species in the wild, I am much more impressed by *N. klossii* with adult pitchers that are typically over 20 cm in length compared the diminutive 7 cm pitchers of *N. aristolochioides*. *Nepenthes klossii* also has thick stems and massive in stature. I rate *N. klossii* high out of the many species that I have seen in situ. A small *Nepenthes maxima* also grew at the site.

As I finished setting up my tripod for photographing *N. klossii*, two drunken villagers arrived. The leader carried a bottle containing homemade distilled liquor, which was illegal in this alcohol-free province.

The leader tried to grab the camera out of a female member of our party, Gina Morimoto, who was by herself. Luckily she was able to fend off the person, but drops of blood from his cut forehead dripped onto her, as he was just in a fight. One nice villager attempted to cool the main troublemaker with money, but the drunk threw the bill on the floor and requested twice the amount. From this moment on, the drunks disrupted our group and no further photographs were allowed to be taken. They seemed to spread anger amongst the other male villagers, and some of them even started to cut

Figure 2: *Nepenthes klossii*.

and uproot one or two *Nepenthes* plants. The friendly villager offered us to wait for things to cool down at his home, while the person whom we asked for visitation permission remained neutral and uncaring at our situation. Our party started exiting the habitat at the opposite direction from where we came from. A few of us left our footwear at the beginning of the bog and unfortunately I had to retrieve mine alone. Chien thought I would be safe by myself, but I was concerned as approximately forty villagers had gathered around us. I collected my sandals without any incident and raced back to the others. We proceeded to walk barefooted in the friendly villager's background. I thought about parasites as the area reeked of manure, unbeknownst if the odor came from pigs, natural fertilizer for crops, or from a lack of plumbing. However wearing sandals were not an option as they could easily be dislodged in the spongy ground. We decided against entering the host's home as the crowd did not dissipate. We proceeded to our vehicles, which the main troublemaker picked up a large stone and was about to smash a windshield when Gina persuaded him not to continue by her hand gestures. We drove off from the site, a little shaken, but unhurt. Chien had travelled multiple times to this village and all were without incident. The hostility we faced was an anomaly.

That afternoon, we traveled to another *N. klossii* site (Fig. 2). This site was a completely different experience than the first. It was for the most part deserted except for one local who stopped his journey and watched over us the entire time with a friendly smile. We had plenty of time to set up our shots and explore the area. Some of the plants grew here were *N. maxima*, *N. klossii* × *maxima*, *N.* (*klossii* × *maxima*) × *klossii*, *Utricularia bifida*, *U. caerulea*, *Dendrobium obtusum*, *D. subclausum*, *Glomera erythrosma*, and *Spathoglottis parviflora*. As terrific as this site was, evidence of draining such as diversion trenches could be seen. We were concerned that this site may be lost in a few years.

At midmorning of July 30th, we headed out to a lake to see Venus slipper orchid (*Paphiopedilum wilhelminae*). Chien had previously visited the site without any issue. We prearranged a boat with a local villager and motored out to the orchid site. This orchid is rare from being over-collected to the point where only a couple plants typically exists at a site. Luckily we were able to witness several blooming flowers.

When I wrapped up photographing the orchid and switched to the lithophytic bladderwort that is most likely *Utricularia striatula* at a quick glance, a boat approached the shore before I could snap a photo. From our previous experience, we quickly grabbed all our equipment and proceeded to our boat. The other boat docked and several people ran toward us shouting, "No photo!" Chien parlayed

with the leader, explaining that we had permission from the police. The leader retorted that we had no permission to be on the land. Chien asked if we could seek permission from his chief, but he replied that the chief did not want to see us and we should leave. The leader seemed to realize that we didn't mean any trouble and let us leave the shore in peace. This encounter surprised Chien as our boat operator, from a nearby village, said that a visit to the lake and shore would be no problem during the prior year's scouting trip.

As we had over an hour left for our boat rental, we cruised around the lake to kill time. We dared not set foot on another beach. When the coast was clear, one of the party members, William Hoyer, wanted to try his newly purchased fly fishing gear. William was immediately told not to cast by our boatman. As we circled around the lake, we noticed that portions of the lake seemed to be sectioned off. People seemed to stay in their sections harvesting fish and plants. As we headed back, we received glaring stares from the local fishing boats as we passed by.

When we returned to the channel where we entered the lake from, the boat that confronted us at the orchid site waited on the left bank. We pulled up beside them and they screamed at our boatman. The leader whom we communicated with earlier was not present, which made parlaying more difficult. The boat prevented us from moving inland. On the right bank, thirty people ran towards us from the field. A second boat pulled up behind us and docked behind us on the right side. We were blocked on all sides. Now fifty people gathered on both shores, including a few brandishing machete-like golok blades. Screams from all angles directed at us and also at each village faction. A person on the right bank charged at us held the golok blade on one hand, but was pulled back by his comrades. Likewise a person from the first boat that blocked us stepped into our watercraft and attempted to cross the channel to assail the person with the golok, but was restrained by his comrades. More people poured in from the fields, increasing the crowd count to eighty. All of the sudden a person onshore screamed, picked up a large log, and swung it like a battering ram pendulum towards me as I was the closest person. Instinctively I ducked and so did a few others in our boat. It turned out that one of our party members candidly took photos of the crowd, which incensed the person with the log. After the photographer put his camera down, the local backed down, but the tension has escalated. Over a hundred villagers flocked the shores. Some people started entering the water and moved toward our boat. People in the boat behind us furiously scolded and kicked mud at our boatmen which splattered us passengers as well. Without warning, two people from the first boat entered ours and guided the watercraft toward land. They must have felt empathic. While the boat was slowly pulled along by the people from the first boat, more local men, women, and children arrived to watch the spectacle enlarging the crowd size to 150 people.

When the boat finally reached land, a female group member got off the boat first. She was immediately stopped by a local, who insisted that she remove her shoes for inspection. She did not seem to comprehend what the local said despite understanding Indonesian. The locals wanted to search us to make sure that we didn't steal anything and hide them in our shoes and belongings. Chien figured out that the locals thought we were smuggling gold from earlier when we attempted to dock. Chien interjected by explaining that we will demonstrate that we had nothing if they allowed us to get ashore into town first. As a result, we were allowed to proceed. Our group walked towards the town as the crowd increased to 200 in size. The crowd surrounded and followed us, all the while yelling and laughing at us. We all maintained a neutral demeanor and kept walking, as to not incense the mob. During this chaos a distinguished looking older man in a polo shirt emerged. He was taller than most Papuans and spoke to us in English. He suggested that we go to the police station to sort out the matter. We agreed and continued approaching the town with approximately 250 locals surrounded us. When we reached the main street, a local man that William met the previous day spoke to him in

pidgin, while no other Papuan we encountered understood. William and the local suddenly made a ninety degree left turn away from the police station and towards our lodging. I was concerned that this abrupt change in destination would irritate the crowd further. When we arrived at the lodge, one of us opened the gate of the picket fence with just enough room for one person to slide through and pulled each of us in. His face showed great concern since the battering ram incident. Over 300 people encircled the lodge, staying outside of the picket fence that the villagers leaned or stood on. However, they yelled and held rocks like they were going to throw at the building. Our trucks were in the driveway blocked by the mob. Behind the lodge was the lake and there was not a back exit. We packed as quickly as we could and hoped to leave when the crowd dissipated.

The police arrived. One officer brandishing a pistol holster tried dispersing the crowd to no avail. The law enforcement presence made the previous day's bureaucracy seem worthwhile. The lodge staff made the best out of the situation by serving us lunch, which we had not considered. About half an hour after eating, a group of local people asked to speak to Chien. Another half an hour passed, Chien emerged and explained the situation to us – the locals were upset, as being on the lake itself was taboo. The permission we received from the police (as typical of regular Indonesia visitation process) and agreement with our local boatman was not enough. We needed permission from every local stakeholder, as several different villages surrounded the lake. Chien empathized with the villagers and elaborated that he would not like it if strangers showed up unexpectedly in his backyard. Furthermore, the locals thought we had taken precious metal from the area. They wanted not only shoe inspection, but our clothes as well. When Chien explained that we came to photograph their beautiful plants and animals, many of the villagers thought that was a complete lie. Unbeknownst to the most of us, one of the world's largest gold and copper reserves is in Papua province. Most of the proceeds go to a U.S. company, while the locals barely receive any benefits. That is why many of the locals are very distrusting of foreigners.

We were asked by the local elders to come out and shake their hands to demonstrate that it was a misunderstanding. Our group walked outside and the English speaking Papuan, who earlier had suggested us to go to the police station, spoke to us explaining the situation. He said that the locals expected us to leave the first thing in the morning. When he finished, we shook hands with approximately eight elders. Our boatman was also present, although he did not speak to us. Afterwards, the elders left and within minutes the 300 person crowd dissipated. Unbelievably, no one lingered in front of our street. Time passed and the pidgin speaking friend gave us nonverbal cues to leave the area immediately, which we had already decided. We left shortly after. We were unable to pay the boatman for his services as he left with the crowd. Due to the incident, we skipped two destinations that were scheduled in the afternoon – a montane *Drosera rotundifolia* L. site and another *N. klossii* location. At least the plants should be well protected from poaching for the time-being. As a precaution, I don't recommend any tourists visiting the area as the situation could still be volatile.

We drove an hour towards the airport where we originated from and stopped to take a look at the view of the valley below. My driver made some hand gestures that looked like rifle shooting. Minutes later, Gina told Chien about it. When Chien returned, the driver revealed that there were bandits in this part of the highway and people were killed. We quickly resumed our travels. Our caravan made a few stops along the way and arrived at the city circa 21:30. Dinner was quickly served. We really wanted have a stiff drink and ease the recent hardships, but it was not possible as the region prohibited alcohol.

Cenderawasih Bay

Our boat departed around noon on July 31st. The watercraft was an outrigger canoe rigged with two engines. The boat leaked with a crew member continuously bailing water. Our local guide indi-

cated that the boat ride should take two hours. At one point, we passed a shipwreck from the previous week. Our local guide mentioned two people died and other crew members were missing. I believe one person was either a police or military officer. The wrecked boat was identical to the one we were on. Our boat also contained no life preservers. We hoped it wasn't an omen of things to come.

During the boat ride, one engine kept stalling as we drove against the waves and currents. Eventually it died and we landed on a small island nearby. The island's shoreline could be walked around in twenty minutes. A family of five inhabited the island. They happened to have a socket tool that fitted our engine bolt.

After repairs, we proceeded towards our destination. Our local guide for this portion did not know exactly where the final destination was. Our guide had explained that he knew the location very well. Thus, we were astonished to find that this was not the case at all. As we already tripled our expected trip time, the sun was beginning to set. We decided to circle back to a bay with a campsite that we passed ten minutes earlier. It turned out that the camp was a village cooperative. Luckily there was vacancy at the site for our group as our local guide did not make any reservations in advance as he claimed they had no phones. Chien found out that the site had a phone and also provided transportation. It seems that our guide circumvented the cooperative for his own gain.

Next morning, August 1st, we were eager to snorkel with whale sharks (*Rhincodon typus*). Three sharks were spotted nearby. When we arrived, there was already a diving group from Thailand waiting to see the sharks. They had been in the area for a week and this was the first time they encountered the whale sharks. The Thai group was kind enough to let us in the water after an hour of waiting, as there were already too many people in the water. We spent little over an hour in the water with the large fish. One of us got "bit" by a whale shark as he sat down next to where the sharks were. The person's movements had mimicked the motion that attracted the sharks. As whale sharks are filter feeders, the person only got scared to much of our amusement as he leapt through the air. Although an amazing experience, there were jellyfish in the water and several people from our group were stung.

We had a quick lunch and prepared to leave the area as our boatmen were nervous that the return journey would take just as long. Our group was in favor of leaving at night when the sea was calmer, which is also when the park boat transports. Instead of a mutiny, we decided to leave as the crew was clearly uncomfortable leaving in the dark. The journey back was uneventful and much quicker as we were with the winds.

Arfak Mountains

August 2nd was mostly a travel day. We left on a medium sized modern fiberglass ship that powered through the waves. Although this was the nicest ship during our travels, there were certain issues with it. It trapped rank water and the two deck hands manually wiped the rain off the windshields.

Arriving at the hotel, we gathered supplies. We were thirsty for alcohol after the near mob lynching experience in the western Sudirman Range. At the hotel where we stayed at, I asked about the cost of a beer. The manager said that the café have them for US$100 per can! The café did not have any and unbeknownst to me, I later found out the reason for the high price was that prohibition was in effect for this area. We were accustomed to the availability of alcohol from our earlier stay on the Biak Islands.

On August 3rd, we ascended Arfak Mountains in off-road trucks. Along the way we saw bottlebrush orchid (*Dendrobium smillieae*). We also stopped at a butterfly farm to see New Guinea bird-

wing butterflies (*Ornithoptera priamus poseidon*), goliath birdwing butterflies (*Ornithoptera goliath samson*), and ant plants (*Myrmecodia erinacea*). Driving half an hour more, we came across *Nepenthes maxima* with a green pitcher with red interior spots (Fig. 3). A black colored crab spider (Family Thomisidae) hid underneath the operculum near the filiform appendage.

Figure 3: *Nepenthes maxima*.

We arrived at Zeth Wonggor's lodging just before lunch. Zeth is a well-known bird guide, whose services were used by Sir David Attenborough for BBC's filming of Attenborough in Paradise. We journeyed after the meal to see several bowers of the Vogelkop bowerbird (*Amblyornis inornata*). Unfortunately we did not see the birds themselves as the most visible one was recently consumed by a predator according to Zeth.

In the early morning of August 4th, we split into two groups. My group went to see the magnificent bird-of-paradise (*Cicinnurus magnificus*). The other group went to see the western parotia (*Parotia sefilata*). When the two groups finished, some of us went to see the feline owlet-nightjar (*Aegotheles insignis*).

When lunch was over, the two groups swapped sites. This time my group went to the western parotia site with two hides adjacent to each other. We were very fortunate to see the male perform its spectacular ballerina dance for forty-five seconds to attract a mate, which he succeeded in doing! Having watched a video documentary on the dance prior to the trip and then witnessing the event firsthand was amazing.

At night, we looked for the elusive cuscus. We first spotted a feather-tailed possum (*Distoechurus pennatus*). Then we spotted several cuscus eye shines. Eventually Chien attempted to handle a northern common cuscus (*Phalanger orientalis*). However the leaning tree trunk where Chien was standing gave away. Both the marsupial and handler were fine after the incident.

For August 5th, we hiked to the summit bog looking for *Nepenthes*. On the way there, we saw more bowers of the Vogelkop bowerbird. These bowers were even more spectacular than the ones we saw previously as the location was further away from humans. As a result, the birds did not use blue plastic trash pieces left by humans for display (as the color blue is difficult to locate in nature (C.C. Lee, pers. comm. 2014)). The bowerbirds preferred plastic material as they do not decay. Further up the mountain, we came across cowl-carrying orchid (*Dendrobium* cf. *cuculliferum*) and bunny orchid (*Liparis gibbosa*). Upon reaching the summit, we saw blue flowered ant plants (*Myrmephytum arfakianum*) that grew both epiphytically and terrestrially, red mottled *Nepenthes maxima* (Fig. 4), lush *Sphagnum* of lime green, brown and golden terminal buds. We also saw orchid species of *Dendrobium subclausum*, *D. fruticicola*, *Glomera* sp., and *Bulbophyllum pristis*. We attempted to locate another *Nepenthes* species that grew beyond its normal elevation range, but were unsuccessful.

That night, we did another night hike, but we did not see any cuscus. We did see several tree frogs (*Litoria* sp.).

In the early morning of August 6th, the group split up into two once again. We had a free morning, so half of us, including myself, went to photograph the magnificent bird-of-paradise (*Cicinnurus magnificus*) again. While the male did perform its mating dance again, I was unable to photograph as I was helping out another member out with their camera at that precise moment. The male mated with a female and it was over. The other group did the same with western parotia (*Parotia sefilata*), but did not see any male displays.

As the day was still young, we drove several hours with one of our bird guides and his family to another location. *Nepenthes maxima* with green with brown mottled pitchers grew here. There were also *N. maxima* plants bearing green pitchers with red spots and another form with mostly red pitchers (Fig. 5). This location additionally grew ant plants with chimney-like structures (*Hydnophytum caminiferum*) and white flowers with pale violet anthers. Equally impressive were *Dendrobium cuthbertsonii* orchids with pink flowers larger than the plant body. These orchid flowers looked similar to *Rhododendron* and *Tecomanthe volubilis* species that bloomed in the area. Other orchids found in the area were *Bulbophyllum pristis* and *Glomera hamadryas*. We left the area and drove for some time. Eventually our guide and his family hopped off the pickups to hitch a ride back to their village while we went our separate way.

Figure 4: *Nepenthes maxima*.

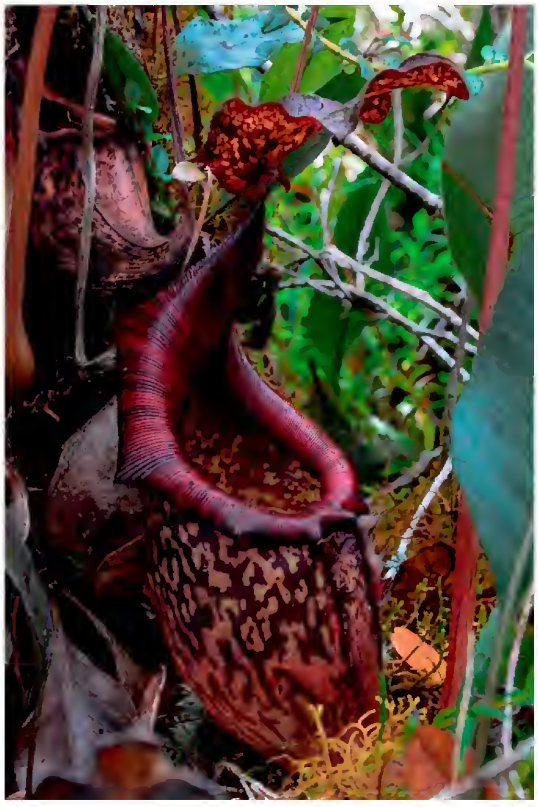


Figure 5: *Nepenthes maxima*.

Raja Ampat Islands

August 7th was a rest day after flying into the coastal city of Sorong. We gathered our supplies for the next trip portion after checking into the hotel. One of the best things about this region was that alcohol could be easily obtained. In addition to the hotel bar, there was a liquor store up the street.

On the morning of August 8th we embarked on a boat ride from Sorong to two neighboring islands – Salawati Island and Batanta Island. Unfortunately our captain was missing. When he finally arrived, we had an hour delay. The boat ride was long and somewhat uncomfortable. Either the pas-

senger was freezing outside from the ocean spray or overly hot inside crammed with the gear. There were wooden benches inside the cabin, but we taller individuals had to crouch down, making it very uncomfortable. We noticed that the life vests were securely tied down on the side boards, such that in the event of an emergency one could not undo the knots in time! We remedied the situation and informed the captain of the reasoning.

We first travelled to see the king bird-of-paradise (*Cicinnurus regius*) on Salawati Island. We heard the bird often, but only saw it a few times high up in the canopy. While waiting we saw a male olive-backed sunbird (*Cinnyris jugularis*) with a bright yellow belly. Afterwards we stopped at the local visitor administration office to pay for the visitation, which we were charged with a new fee that Chien had never heard of before.

Returning to our boat, we went to Batanta Island 1 km away. We were to stay at the wonderful outdoor accommodation with washing sinks where Chien stayed the prior year. This village is also said to have refrigerated drinks and ice cream, which is a luxury in Indonesia. When we arrived, we easily located the general store with the cold food items, but the said lodging had been washed out! In addition, apparently no other visitors came since the storms and the camp was never rebuilt. The villagers were really hospitable and converted an empty house for our lodging and provided a patio area for hammocks. We had time to spare and we explored the port area. A common kingfisher (*Alcedo atthis*) perched nearby and many sulphur-crested cockatoo (*Cacatua galerita*) were in the far distance. We also came upon a full-sized white-lipped tree frog (*Litoria infrafrenata*) asleep in a tree. Further down the shore grew urn vines (*Dischidia nummularia*).

An hour later, we left to see the first of two birds-of-paradise that are found on Batanta Island; these birds are not found on Salawati Island despite the short 1 km body of water separation. The male red bird-of-paradise (*Paradisaea rubra*) perched very high in a tree, performing summersaults around a branch to attract a mate.

Returning to the village, we had dinner that night in a different house. If we had thought the villagers were exaggerating about Chien being the last visitor, the guestbook proved otherwise.

Early next morning on the 9th of August, we rose before dawn to see the Wilson's bird-of-paradise (*Cicinnurus respublica*), which is the second species found on the island. Heavy rain poured and we had to wade across two streams that gushed out to the sea with the water level reaching our thighs from the storm. Luckily the rain stopped shortly after and we arrived at our destination. The group divided into two again. My group first saw the female Wilson's bird-of-paradise. Twenty minutes later, the male arrived and danced for the female. Within two minutes the ritual was over.

We finished lunch at the village pier and traveled to our last destination. On the boat journey, a flock of lesser frigatebirds (*Fregata ariel*) dive bombed in a feeding frenzy. After the excitement, we arrived at the pristine limestone island with thatched cottages on stilts above the aqua colored ocean water right next to the white sand shoreline.

On the morning of August 10th, we started the day with water activities near our lodging. Raja Ampat is one of the new hotspots for diving and the marine biodiversity did not disappoint! Most of us spent the morning snorkeling, but a few of us went scuba diving instead.

When we returned to the shore, it happened to be negative tide. As such, we saw several giant clams (*Tridacna* sp.) below our cottages being exposed to the air when normally they would be submerged in water. William spotted a reef stonefish (*Synanceia verrucosa*) below his deck that was well camouflaged with the white sand and coral. Mantis shrimp and various species of large crabs were seen as well.

That afternoon, we took a boat to another island that had six human skeletal remains in an alcove. Our guide did not know the bones' history. We went by several other limestone islands with Chien

Figure 6: *Nepenthes insignis*.

scanning for *Nepenthes*. We came across an orchid with leaves that looked like a Venus slipper orchid *Paphiopedilum* Pfitzer from the leaves only. We also saw *Spathoglottis portus-finschii* and *Dendrobium bracteosum* orchids, *Myrmecodia platytyrea* ant plant, and an elegant imperial-pigeon (*Ducula concinna*) that was white with emerald colored wings. As we were about to head back, Chien spotted a *Nepenthes* plant growing on a limestone cliff. This occurred immediately before Chien was about to give up searching. It looked immediately similar to *N. insignis* Biak form (Fig. 6). Upon closer inspection, Chien thought it might be a new species! There was only the single plant inaccessible from the boat as it grew on a vertical cliff. We found a beach nearby and climbed to a high vintage point to survey the surroundings. I thought one person may be able to scale the cliff where the plant grew, but it would take at least half an hour to do, which we did not have the time for as the sun was about to start setting. Finding the taxa gave us such joy from all the life threatening hardships we faced earlier. We left the beach and surveyed the cliffs during the boat ride back. Chien found another *Nepenthes* plant of the same taxa with a stem reaching the seawater! Chien had never seen anything like it before. As we were rapidly losing sunlight, we departed towards the island where we stayed.

After a delicious dinner, we watched denizens of the coral reefs from atop of the pier. We saw a cuttlefish, numerous blacktip reef sharks (*Carcharhinus melanopterus*), narrow-lined puffer (*Arothron manilensis*), and a Raja epaulette shark (*Hemiscyllium freycineti*) that "walks" on the seafloor with their fins.

Our final day of the tour was August 11th. We had some spare time in the morning prior departure from the wonderful Raja Ampat area. We spent the time looking at the second of day of negative tide. I also scanned the island for *Nepenthes*, but did not find any.

We ended up leaving about two hours behind schedule as we waited for the sea calm down. While at sea, the rain started coming down and the boatmen rolled down the side clear rubber tarps and tied them down to keep out the moisture. This also meant that the temperature inside the boat built up like a vivarium with lights. Those of us inside were overheating, while those outside were freezing. Eventually a side tarp was rolled up a little to provide air circulation. Otherwise, I think the high interior temperatures could have caused heat illness.

As we approached an inhabited island, a 1.2 m wave hit the boat. The boat was not designed to handle rough waters and that wave could have swamped us. Once we reached the island's pier, the captain refused to continue any further as we were about to hit the open sea. While we waited, the

weather cleared up with the sun coming out, but the captain was adamant with his decision. All of us passengers were desperate to return as our flights were for the next morning – some of us were going on the extension trip, while others were returning home. The captain went out of his way to help us – he refunded half of his fees and he called other islands trying to secure another boat for us. A couple of hours passed and the captain said that he secured a fiberglass boat for us. The second boat was supposed to be made of fiberglass and had two 185 horsepower engines. What seemed to be another hour passed when a boat arrived. Some of us looked at each other, hoping that it was not our boat, but it was. Although the boat was fiberglass, it was a 4.9 m boat with three crew members and only one 85 horsepower engine. The boat had a frame for tarp roof and benches on each side. As it was about to get dark, we decided to get on.

Our group of ten travelers and the three crewmembers squeezed tightly in the boat. We further overloaded the watercraft with all of our gear. The first half an hour was pleasant as we talked about how calm the sea was and how our previous boat captain should have taken us. We saw various other boats cross the channel. During this time, a flying fish flew into my back.

Then the weather turned. The rain started to pour down. A crew member that was sitting up front with our gear moved to the rear next to the engine. I sat in the starboard side second from the front, immediately behind Chien. Directly across from Chien, on the port side was Gina. Next the waves started pounding us on the starboard side. Chien received the blunt of the waves, while Gina quickly threw her camera backpack underneath the luggage tarp in front and grabbed onto the tarp as that was the only support. We were being drenched. Chien tried to stay seated, but the boat rocked too much and he was forced to follow Gina's suit and grab hold of the tarp. I threw on whatever disposable plastic sheet raingear that I had in my possession, but my proper rainwear was under the tarp in my backpack. William sat immediately behind me. He mentioned out loud to quickly locate his emergency radio beacon in his dry bag underneath the tarp that if the boat is going down. Good luck with retrieving it! Our only light source was a blinking LED on an inexpensive flashlight. It was now at night, pitch dark, and we were out on the open sea. As there was no navigational equipment, the crew navigated by using the faint city lights far off in the distance that I couldn't see. We also had no life preservers. One person on the boat did not know how to swim. There was no two-way radio onboard and I doubt there were flares. The rain poured profusely down as the waves increased in size. As the surf crashed into the boat, it would propel us off the seats and then gravity will pull us back down on the hard fiberglass surface. The waves continued slamming us for the next two hours as we didn't realize we were heading into the storm. Being on the boat became a test of endurance. I wondered what I would do if the boat capsized. I also pondered if I survived, would my new DSLR camera be ruined? There were a few instances when our boat's single engine stalled out. Luckily, a crew member was able to get it running one time with a screwdriver. Another time, I was told by someone who understood the Bahasa Indonesia language that a crew member exclaimed, "That was not supposed to come off," referring to an engine part. He repaired the issue by sticking the screwdriver to keep the part on. William attempted to keep the morale high by telling jokes and singing "Jack the Necrophiliac." Due to the seating position that I was at, I could not see the waves despite the constant seawater splashing on the right side of my face. I was told that the waves were about 2.1 m in size, which they could easy have capsized the boat. Three hours into the boat ride, the waves subsided. The crew member that was manning the engine was exhausted and was relieved by another. As we neared civilization, the crew followed the dim city lights now visible to me. They were unfamiliar with our destination city; fortunately, we were able to use Chien's GPS at this point to head toward the correct direction. Half an hour later, we finally made it to the port where we departed from.

Earlier when we left from this port, William had been cautious about avoiding contact with the port water as it was a disease vector. He now stepped directly in without care. We unloaded as quickly as possible. Some of us were shivering from the cold and wetness. We drove back to the hotel with a bar where we had previous stayed. Unfortunately, the bartender had left for the night and they would not let us pour our own drinks. Luckily, we had called ahead and dinner was prepared and beers were still available.

As we ate dinner past midnight, we were all very tired. We hurriedly ate and drank beer as half of the group was continuing onto Doorman Top extension and they had an early flight, while the rest of us were going home. We said our goodbyes and wished each other well.

In the early morning, before the sun was up, Chien and the extension people left the hotel. The rest of us went separately to the airport. We ran into each other before the departure gates and said our farewells.

Epilogue

During the trip, we encountered some dire situations despite the preparation done in advance. Luckily we made it through without any serious harm and came back with some great stories. Chien remained calm during the most stressful of times, which in turn kept the crowd in check and avoided a powder keg from igniting. Unexpected events occur in third world countries in remote areas not frequented by tourists.

Since our trip, Chien has returned to Papua multiple times without any incidents. Unfortunately due to the potentially volatile situation with the *Nepenthes klossii* region, he has not returned there and has no plans to. The Biak form of *N. insignis* are hanging on and another population has been located. Some of the orchids that we have seen on the travels have since been poached (C.C. Lee, pers. comm. 2015). Chien has been able to revisit the suspected new *Nepenthes* species in Raja Ampat and determined that it is in fact *N. insignis* Biak form.

Reflecting on the trip, I have realized that I rather rely on my own physical abilities and survival skills to handle outdoor hardships like I experienced in Sumatra than what we encountered in the boats or with the mobs in Papua. The Papua trip is the closest thing that I have experienced to what the Victorian explorers may have endured, but I have heard that the Wild Papua extension may have been even closer.

Since the 2014 Papua trip, several people from my group have gone or are signed up for another wild adventure with Chien, myself included.

Acknowledgements: I especially thank Chien Lee for all the adventure, hardships, for safely leading the group out of danger repeatedly. I would like to thank Gina Morimoto for reviewing the paper. I thank the following people who provided or helped with the identifications – Chien Lee, Andrew Murray, Andre Schuiteman, Matthew Jebb, Ron Parsons, Rick West, and Eric Hunt. Special thanks to Robert Gibson for his assistance with the references. I lastly thank the friendly locals who helped us through the tough spots.

References

Cheek, M. and Jebb, M. 2001. Nepenthanceae. Flora Malesiana, Series I, Vol. 15, iv+164p, p27-28.

Jebb, M. and Cheek, M. 1997. A skeletal revision of *Nepenthes* (Nepenthaceae). Blumea. 42:1-106.

A carnivorous plant lover remembered

Laura Del Col Brown • Harrow • Middlesex • UK • perodicticus.potto@gmail.com

In 1976 my father, Jeff Del Col, published an article in the Carnivorous Plant Newsletter 6(1):9, suggesting the possibility of feeding carnivorous plants on freeze-dried tropical fish food "if living insects are undesirable in the home." "I must emphasize that this is only a suggestion," he wrote. "I have done no experiments, although I plan to this summer using *D. rotundifolia*."

I was a year old at the time and don't remember the experiments. Nor do I know whether my father — who died unexpectedly this past March at age 68 — was the first person to come up with the idea; Google suggests that it's now common practice. But I do know this incident was typical both of his love for carnivorous plants and of his curiosity about the world in general.

When Dad wrote his article, our family was living in a trailer near West Virginia University, where he was working toward his Doctorate of Education in Literature and Technology. Somehow he had managed to find space for his plants and as much of their paraphernalia as he could get away with (I suspect it was Mom who decided that living insects were "undesirable in the home"). Later we moved 30 miles south to the small town of Philippi, where he taught English at Alderson-Broaddus College (now Alderson Broaddus University) for over 35 years. The move gave him more room to grow plants both indoors and outdoors, and he was surprised to find that *Nepenthes* would thrive outside in West Virginia's relatively mild climate.

At school I learned to draw gardens with rows of lollipop-stick flowers, but I knew reality was stranger and more wonderful: the flytraps with their pink eyelashes, the jeweled pincushions of the sundews, the tiny lakes hidden in the pitcher plants. When I became aware of how these plants nourished themselves, I felt the same mixture of fear and awe as when I learned that my grandfather had observed the atomic bomb tests at Bikini Atoll. Sometimes when no one was watching, I would brush the marginal teeth of a flytrap with one finger, then snatch my hand away. (I didn't know that the actual trigger hairs were on the leaf surface.)

Carnivorous plants weren't the only ones Dad grew, but all the plants he chose reflected his fascination with (to use a phrase by Gerard Manley Hopkins, one of the many poets he loved) "all things counter, original, spare, strange." His other favored families were cacti and orchids. Even when he took up rose gardening in the 1990s, he focused on nearly forgotten antique varieties: I learned to drive by accompanying him on his "rose-rustling" trips to tiny mountain graveyards. When not

tending his own plants, he could often be found in the woods, carrying a field guide to lichen, fungi, or slime molds. A year before his death, he announced with great triumph when he finally found bird's-nest fungus in the wild.

I moved to London after my marriage in 2000, but plants continued to provide a bond between Dad and me. Often I would put a picture on Facebook of something I had seen growing in the wild or at Kew Gardens, and he would come back within the hour with a species identification and some information about its life history. I eventually went to work for a bat conservation charity, so we both had special reason to be delighted when scientists discovered that Hardwicke's woolly bat had a mutualistic relationship with *Nepenthes hemsleyana*, fertilizing the plant with its droppings in exchange for shelter.

In the last years of his life, my father lamented that he didn't have a Wardian case, which would have allowed him to grow *Nepenthes* even more successfully. It must have been one of the few pieces of equipment he didn't possess; his Hopkinsian fascination with the world extended to "all trades, their gear and tackle and trim." After he died, it took my mother several weeks to go through his plants and tools. Most of his indoor plants went to the biology department's greenhouse at Alderson Broaddus, where students will look after them, as did most of his equipment and his horticultural library. I've kept two plant books he was especially fond of: Carnivorous Plants by Adrian Slack, and Francis Ernest Lloyd's 1942 classic of the same name.

Dad did differ from Hopkins (a sincere but insecure Jesuit) in one respect. In a sermon from 1880, Hopkins told his congregation that humanity's mission was to "spread over the earth … outside Paradise full of thorns and thistles, and reclaim it piece by piece to the condition of Paradise itself." Dad knew that the "thorns and thistles" were *part* of Paradise, and that we reclaimed them simply by appreciating them. If there is a garden in the next life, I know he's searching its neglected corners and forgotten bogs for *Pinguicula* and *Aldrovanda vesiculosa*. Even if there isn't, those whose lives he touched will honor him by doing the same on earth.

New cultivars

Keywords: cultivar, *Heliamphora* 'Red Mambo', *Pinguicula* 'Niklas', *Pinguicula* 'Red Starfish', *Sarracenia* 'Cancan', *Sarracenia* 'Whale Tail'.

Heliamphora 'Red Mambo'

Submitted: 19 September 2016.

I found this amazing and very elegant plant in a private collection, years ago. The label was missing, but the morphology of the nectar spoon and the woody stem clearly show, in my opinion, an influence of *Heliamphora heterodoxa* and *H. tatei* (Fig. 1).

I tried to produce seeds three times, under different growing conditions, but each attempt failed, so the plant is maybe sterile. The flower stalks are about 50 cm tall. It is a very slow grower, but vegetative propagation by rhizome cutting or division is quite easy, and the only method to keep the unique morphology.

The mature pitchers stand 18 cm or taller, colored green with red edges and veins. The pitcher outside is completely bald; the inside has a short white fuzz. The neck under the nectar spoon is fire red under good lighting.

The nectar spoon is very unique. Fully developed (under massive lighting of four 24w 6400k T5 fs), the nectar spoon is 1 cm long and about 0.3 cm wide. With a fire red "conquistador helmet" style, the nectar spoon also has a horned ending, pointing to the sky.

The name 'Red Mambo' came from the from the nectar spoon color and shape which reminds me of the very graceful mambo dance with wide movements.

—François Boulianne • Montréal • Quebec • Canada • dallas@dallasmail.com

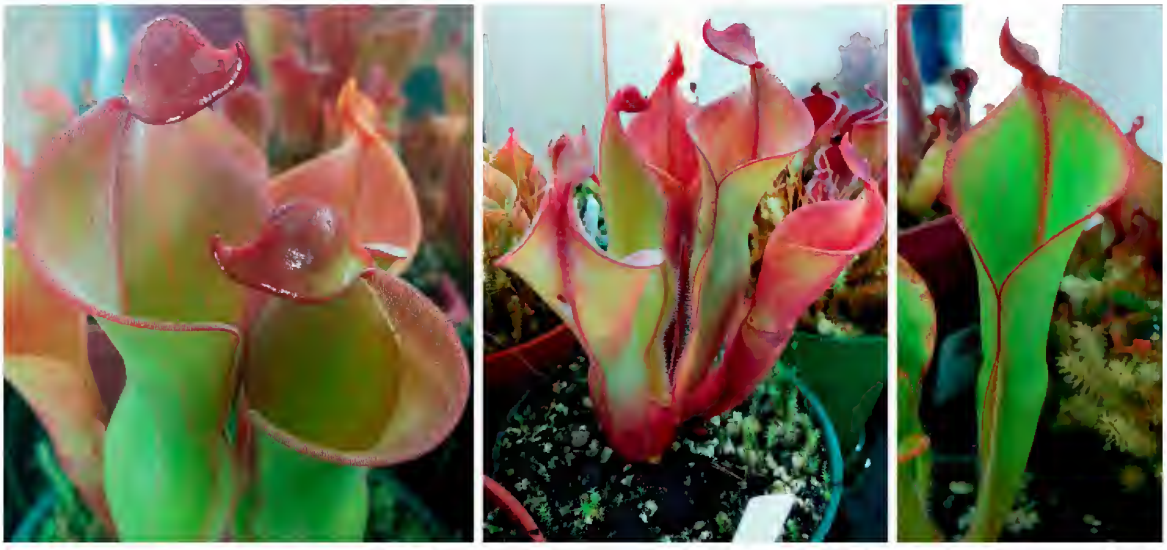


Figure 1: *Heliamphora* 'Red Mambo'.

Submitted: 29 July 2016

Sarracenia 'Cancan' (Fig. 2) was selected from the cross of *S.* (*flava* var. *maxima* × *purpurea* subsp. *venosa*) × *flava* var. *atropurpurea* performed in 2007. The maternal clone was *S. flava* var. *maxima* × *purpurea* subsp. *venosa*, a robust, big-lipped clone exhibiting terracotta red coloration with inverted yellow veins. The paternal clone has a large red ruffled lid and is believed by some authors not to be a true *S. flava* var. *atropurpurea*, but rather a complex artificial hybrid.

Figure 2: *Sarracenia* 'Cancan'. 1 flowers; 2 detail of the pitcher; 3 mature plant.

The seedling population gained from this cross demonstrated great color variability. One of the seedlings was selected due to an exceptionally intensive, all red coloration. It also belonged to the strongest seedlings in the population. Later on it became apparent that this clone exhibited an irregular shape of the pitchers, including twisted lids. This feature is usually considered a negative character and such plants are eliminated in our collection. Reaching maturity, the plant demonstrated high number of pitchers, exceptional robustness, and overall beauty that was considered exceptional by many visitors of our nursery. Therefore we decided to establish this unique plant as a cultivar.

Sarracenia 'Cancan' is 20-25 cm tall, the peristome is 4-6 cm wide, the lid 8-11 cm wide. Mature plants produce 5-8 pitchers on one growing point, typically 7. Flowers are red-orange with yellow-green umbrella. The overall shape of the flower is globose, size 6-7 cm. *S.* 'Cancan' is well fertile, the capsule contains usually 200-300 moderately sized, viable seeds. Root system of *S.* 'Cancan' is exceptionally rich, making the plants very well fixed in their pots. Also rhizome offshoots start producing their own roots readily, making vegetative propagation of this clone more effective. All means of vegetative propagation are suitable for maintaining features of this described cultivar that was named according to the look of dancers of French dance Cancan.

—Miroslav Srba • Horakov 156 • CZ-664 04 Mokra • Czech Republic • srba@sarracenia.cz

Submitted: 29 July 2016

Hybrids between *Sarracenia purpurea* subsp. *venosa* and *S. oreophila* are well known to be very vigorous and produce robust pitchers with a huge lid. These hybrids are intermediate between the bulbous and erect type of *Sarracenia*, resembling habitus of *S.* × *catesbaei*. The aim of this cultivar cross was to obtain a short-pitchered hybrid with a large lid, but shifted to the elegant "flava/oreophila" shape. A backcross hybrid *Sarracenia purpurea* subsp. *venosa* × (*flava* × *purpurea*) was used as the seed plant instead of the botanical *S. purpurea* subsp. *venosa* in order to introduce a genetic portion of *S. flava*. This hybrid was pollinated with *S. oreophila* in May 2002. Unfortunately only 2 seeds were produced, but only one of them germinated. Selection of the best seedling was groundless therefore. Surprisingly the single seedling fulfilled all expectations.

Sarracenia 'Whale Tail' (Fig. 3) has red-orange pitchers shaped somewhat like a shortened *S. flava*. The traps are very robust and keep a height:lid size ratio 3:1. The length of pitchers in mature plants is usually 30 cm and width of the lid is 10 cm. The record pitcher observed reached 42 cm with a 14 cm broad lid. Due to the silhouette dominated by the enormous lid, I decided to name this plant *Sarracenia* 'Whale Tail' as it resembles the tail fin of whales emerging above the sea level. The pitchers are not durable and are lost during winter dormancy. Phyllodia typical for *S. oreophila* are formed very rarely in *S.* 'Whale Tail'. However, the plant might form late autumn pitchers having a *S.* × *catesbaei* shape. The flower color is salmon. Petals are yellow marbled, eccentrically shaped. Diameter of the flower is 7-9 cm. *Sarracenia* 'Whale Tail' is a poor producer of seeds. Only few seeds are usually found in the capsule. The pollen is well viable. The root system of the plants is quite poor, similar to those in *Sarracenia purpurea*. The plant has a strong tendency to produce small, viable offshoots. This feature was the last point to decide register this plant as a cultivar as I believe it can quickly spread among all collectors who are interested. All vegetative means of propagation are suitable for maintaining of all characteristics of *Sarracenia* 'Whale Tail'.

—Miroslav Srba • Horakov 156 • CZ-664 04 Mokra • Czech Republic • srba@sarracenia.cz

Figure 3: *Sarracenia* 'Whale Tail'. 1 mature plant; 2 detail of the pitcher; 3 flower.

Pinguicula 'Niklas'

Submitted: 15 July 2016

After having registered my cultivar *Pinguicula* 'Florian' more than 10 years ago, I still wanted to create a second cultivar and name it *Pinguicula* 'Niklas' after my second child, Niklas. For that, in 2014 I crossed *Pinguicula moranensis* from Sumidero Canyon (clone 1) with *Pinguicula emarginata* with dark violet veined flowers. A year later I could already see the result of that crossing and I was satisfied with the outcome combining characters of both species in this new cultivar.

The cultivar forms a winter and a summer rosette. The winter rosette consists of 10-15 succulent obovate-spathulate leaves, slightly pointed at the tip, glabrous, of a light green color, 9-12 mm long and 5-7 mm at the widest point. The summer rosette (Fig. 4) consists of 7-9 leaves, obovate-spathulate, with the margin involute, light yellow-green to red-green (depending on light conditions), 25-37 mm long, 15-20 mm at the widest point, the upper surface densely covered with sessile and stipitate hairs.

Flowers are produced out of the summer rosette, with 1-3 flower scapes per season, erect, 70-75 mm long, olive or olive-red, densely covered with stipitate glandular hairs. Flowers are about 25 mm long (including the spur), the corolla is about 2 cm in diameter (Fig. 4). The calyx bilabiate, red-brown, with calyx lobes cuneate-linear, 2.5-3 mm long and 1-1.5 mm wide, rounded or obtuse at the tip, the outer surface sparsely clothed in stipitate glandular hairs. The corolla consists of two lips. The 2 lobes of the upper lip are truncate with the end of the lobe slightly incised. Corolla lobes are of a purple-violet color with fine, darker violet venation. The lobes of the upper lip are 9-10 mm long, 6 mm at the widest point, side lobes of the lower lip 9-10 mm long, 6-7 mm at the widest point, middle lobe of the lower lip 13-15 mm long, 9-10 mm at the widest point. The spur is of a light green color, about 17-18 mm long, in the middle slightly thicker, obtuse at the end and densely covered with stipitate glandular hairs.

Pinguicula 'Niklas' must be reproduced vegetatively to preserve the unique characteristics of this cultivar.

—Oliver Gluch • Im Gebel 6 • 67376 Harthausen • Germany • oliver@gluch.info

Figure 4: *Pinguicula* 'Niklas' summer rosette and flower.

Submitted: 29 July 2016

Pinguicula 'Red Starfish' (Fig. 5 & Back Cover) provides an unusual look that is much more "carnivorous" compared to other *Pinguicula* species or established cultivars. As the plant resemble dangerous predator of tropical coral reefs, we decided to name the new cultivar *Pinguicula* 'Red Starfish'. This plant originated in Botanical garden of Liberec (Czech Republic) in 1994 as a cross between red leaved *Pinguicula moranensis* and *Pinguicula heterophylla*. This clone was selected in 1997 with a special emphasis on the flower color.

Summer leaf rosette is usually 6-9 cm in diameter and consists of 12-20 leaves. Leaves are lanceolate, rolled downwards in lateral as well as in tangential direction. Well-illuminated plants turn into a red-purple coloration. Winter rosette is bulbous, predominantly submerged, and similar to *P. heterophylla*. Winter "bulb" of juvenile plants is fusiform, in mature plants almost globose, consisting of 40-70 leaves. *Pinguicula* 'Red Starfish' flowers in the beginning of the vegetative season, just after waking from the dormant period. Flowers are sterile. Corolla is dark blue-purple, resembling *P. heterophylla* in shape. Petals are slightly twisted. Size of the flowers is 18-22 mm. Spoon is straight, about 20 mm long. Flower stalk is 9-13 cm tall.

Sufficient growth conditions for *Pinguicula* 'Red Starfish' are the same as in other Mexican *Pinguicula* species strictly undergoing dry winter dormancy like e.g. *Pinguicula gypsicola*, *P. heterophylla*, or *P. medusina*. Although it doesn't exhibit any specific growing requirements, we would like to provide several tips to optimize growth of this cultivar. During the first years of our experience, it seemed that *P.* 'Red Starfish' is not very floriferous. Later we realized, that the growth period

Figure 5: *Pinguicula* 'Red Starfish'. 1 summer rosette; 2 winter rosette (bulb); 3 flowering plant.

of this clone is very long, lasting until November or even December in conditions of central Europe. If the growth activity is rapidly interrupted by low temperatures or rapid drought, the fitness of dormant plants is significantly decreased. On the other hand, if mild temperatures (8-18°C) and slightly wet soil is provided during the phenophase transition (beginning of dormancy), the winter bulbs get much stronger. Specimens that formed bulb at least 10 mm wide bloom regularly with 1-3 flowers.

Propagation is possible only by vegetative means, especially by winter (bulb) leaf cuttings. We recommend to lay these cuttings carefully in a small furrow formed e.g. tip of tweezers. Cuttings that are comfortably seated in such a depression start formation of a new plantlet quickly. 20-30 new plants can be obtained from a single adult specimen of *P.* 'Red Starfish'. Authors also established viable tissue culture of this clone to provide specimens of *Pinguicula* 'Red Starfish' to all collectors who would like to enjoy this unusual cultivar.

—Miroslav Srba • Horakov 156 • CZ-664 04 Mokra • Czech Republic • srba@sarracenia.cz
—Miloslav Studnička • Botanic Gardens Liberec • Purkynova 630/1 • CZ-460 01 Liberec • Czech Republic

The ICPS conference 2016

Marcel van den Broek

This year the ICPS conference was held in Kew Gardens, London. The CPS had offered to host this event and our British friends did a lot of hard work to make this event possible. A very big thanks goes to them for pulling this off. I know that while the participants will not have noticed this, many things needed to be done, even up to the last moments, to make things run as smoothly as they did.

As for the conference itself, we had of course a great setting with the botanical garden. There was not much time to see the gardens themselves if you wanted to follow most of the lectures on a very full program.

The lectures where shorter than usual to allow more speakers to tell their story, and I feel a bit divided about that. I loved the lectures but not all fitted as well as others in 25 minutes instead of 45. For many I wanted to know more! There is a balance to be found here, though I'm not sure what that is.

The room we had for the lectures was nice and was just about full with about 160 participants, which is more than usual (Fig. 1). Previous conferences usually top out at 100-120 participants. I'm quite sure the location helped. Being in Europe and Kew's reputation might have pulled some people over the big drink. Several told me that they had wanted to visit Kew for a long time.

I would be interested to hear how Kew Gardens lived up to their expectations. It is a great park and a huge space, but in my personal opinion the quality of the collections and presentations is di-

Figure 1: Attendees at the 2016 ICPS conference held in Kew Gardens, London.

verse and ranges from very good to very disappointing. The displays I managed to visit seemed to underwrite this opinion formed on earlier visits.

Anyway, back to the conference. The room and the number of people also made for a hot environment and the need to open the back doors. We had very warm weather, something the UK is not known for, but does occur as those of us who were there can testify.

The participants got to listen to presentations that ranged across all kinds of topics and delivered by people that ranged from some of the most highly regarded speakers in the field to students. This last part was all in good ICPS tradition, as we make it a point to invite people at the earlier stages of their career to be part of the program.

I won't go into detail on all of the lectures, there were just too many of them. As for the ones I do mention, I'll be brief as I will never be a match for the original speaker. You'll just have to wait for the movies that got shot to be uploaded (and the articles to be printed from those who didn't want to be filmed, usually because some of the stuff they talked about wasn't ready to publish yet and that sort of reasons).

So, here is just a quick selection.

The first speaker was Fernando Rivadavia, filling in for Andreas Fleischmann who couldn't make it unfortunately. Essentially Fernando presented the huge advances in genetic knowledge that were made since he presented the tiny genome size of some *Genlisea* for the first time at the 2010 conference. Genetics is getting far more advanced and *Genlisea* is at the point of it all.

Ulrike Bauer presented her research on the role of rain in the capture of prey by *Nepenthes*. Some of you will have seen something about this on Facebook, but to get the complete presentation is a different level. One thing that stuck in my mind was the film that showed how the shape of the lid helps with the capture, as a regular lid would vibrate and wobble and just knock the ants all over the place. The specially adapted lid reacted totally different and made a clear and straight up and down motion resulting in the ants being tipped in the pitcher with some nice accuracy.

Laura Skates was one of the students and she took the opportunity offered for a poster presentation. In a nice and compact overview, she went into part of her research on the *Byblis* family of her native Australia. I like the idea of having poster sessions, but the CPS had done it a bit different than usual. One lecture spot was reserved to look at the poster presentations. Usually the posters are set up and people walk by them at various times. This is what I actually like about the fact that every two years there is a different host. Everyone has slightly different ideas on how to do things and are thus making others think. Some ideas are keepers, others not. Which one it is depends on the person observing it and the team that plans the next conference.

Simon Poppinga had a nice presentation on *Utricularia*. Lots of interesting information on trap structure and how the effectiveness of the traps is related to the shape and construction of the trap. Amongst the things he told us was something I never realized. The speed with which the prey is sucked in to the trap is such that the prey is actually smashed into the trap wall and is actually killed by that crash.

Greg Bourke was a bit of a tease. He gave some interesting food for thought on the variety of plants we put in the *Drosera binata* cluster, hinting of several interesting things that we will have to wait for the paper to come out to actually find out. But it is obvious that some splitting is about to occur so get your label writer ready.

Perhaps the oddest lecture topic was presented by Evin Magner. Doug Darnowski couldn't make it, so this student was sent to present the idea that some seaweed might actually be carnivorous. To put a pin in everyone's balloon of imagination, no proof was offered. The basis of this idea is that seaweed occurs in places that on paper don't have enough nutrients to support them and that in the seaweed group there are plants capable of making every structure, possibly including those that

Figure 2: Sir David Attenborough (right) thanking the audience for the painting that was just presented to him by CPS co-host Tim Bailey (left) and ICPS President Marcel van den Broek (middle).

could be used to capture prey. Evin made a valiant effort to defend the idea, but while his talk was clear and decently put together, the idea he was sent to present was, in my opinion, weak. However, you can judge for yourself, because Doug's paper is on page 140 of this issue.

The absolute highlight was the presentation of a painting of *Nepenthes attenboroughii* to Sir David Attenborough on behalf of the CP community. After a short talk by Rob Cantley, there was a really nice tribute by Charles Clarke. This was followed by remarks by Stewart McPherson, one of many people to be inspired by Sir David's work. After that came the presentation of the painting by Tim Bailey and myself (Fig. 2). Did I mention it was quite hot in the room? Good, they probably thought my sweat was from the temperature!

What actually helped was that I had met Sir David during the break before the presentation. He is really nice and manages to make you feel more relaxed than logically would be the case. I put this down to two things. First of all, I grew up with his documentaries (who didn't?) and that sort of gives you the feeling you know him. Secondly, he is so incredibly modest in his attitude. "So I have been on TV since the 1950's and set todays standard for a nature documentary. I was just doing my job which I happen to love" would be how I would sum this up.

By the way, there was another celebrity there. Bill Bailey (no relation to Tim), a famous UK comedian and presenter, was also in the audience to watch the presentations.

Having survived the presentation and unveiled the wonderful painting by Lucy Smith, the audience got a really nice speech as Sir David was kind enough to say a few words. In his well-known voice, he gave a thanks and told us about his connection to carnivorous plants from his days as a boy exploring the British countryside till the present day. He spoke with great humor and soon the whole room was captured by his remarks and quotes. The question about why the nectar on the lid of a *Nepenthes*, that had small rodents licking the nectar in order to collect their droppings, didn't contain a laxative sure got everybody laughing.

In conclusion, I can say it was once again a great conference and I'm already looking forward to the next one in 2018. By regular rotation the next conference should be in The Americas. So, if you are interested, the call for proposals will be made soon.